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Training practise: Case Study/Assignment

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ADMI | AI | FULL STACK

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# Case Study

## Introduction

This case study assignment is intended for hands-on training for Full Stack developers. Nevertheless, it shall be used for other training streams as well. It is nothing but a basic requirements specification document. As such technologies and development methodologies are not included intentionally.

Steps to be followed

1. Do the requirements analysis
2. Create domain model
3. Create ER diagram
4. Create class diagram and sequence diagram
5. Create wireframe/prototype (feel free to be creative. Or get inspired from the likes of Amazon, Flipkart etc.)
6. Develop the application

Items 2 to 5 are to be captured and delivered in a design document.

The application

E-commerce sales platform

SCOPE

The software system being produced is called E-Commerce System (ECS). It is being produced for a customer interested in selling products via the Internet. This system is designed to “provide automation support” for the process of placing products for sale on the Internet and facilitating the actual sale. The system will be run on a central server with each user having a remote user interface through a web browser to interact with it.

The E-Commerce System will allow any user to create an account to become a customer. The customer, through the process of account creation, will have the option to become a member of the site. The system will allow customers to browse, search, select, and add products to a shopping cart. Then, provided they have products in their shopping cart, check out products in shopping cart and decrement the stock that the inventory the system maintains. The ECS also allows a manager to manage the inventory with full create, retrieve, update and delete (CRUD) functionality with regards to products in the system. It will also allow, on an inventory wide basis, customers and managers to interact with a promotion system that handles percentage-off promotions that can be applied to member’s orders. This interaction includes the creation (by managers) and the application to orders (by customers) of the promotions. The ECS has full email capabilities; the automated email functionality will be used to send promotions to members of the system as well as provide the managers with low-stock notifications.

Overall Description

This section includes details about what is and is not expected of the ECS system in addition to which cases are intentionally unsupported and assumptions that will be used in the creation of the ECS system.

1. ProductFunctions

ECS will provide several functions; each one is listed below.

• Maintain data associated with the inventory (a collection of products)

* Each product will belong to a category. E.g. a book category has a title, author and price
* At least 2 categories of products to be allowed
* The inventory also keeps track of the stock/quantity of each product

• Maintain records for many customers

* A customer can be either a member or non-member.
* A customer has a username (unique across all users), password (no restrictions), email

address (no restrictions), and postal address (unverified.)

* Anyone may sign up for a customer account.

• Allow any customer to become a member.

• Show a listing of available products

* Products are to be displayed in ascending alphabetical order by name.
* Each product will list its properties from left to right.

• Allow customers and managers to log in and out of the system.

* Users (both customers and the manager) will be logged out if inactive for 30 minutes.

• Shopping cart

* Anyone can add one or more products to the shopping cart.
  + The shopping cart does not need to allow multiple copies of any product.

• Checkout

* Checkout is only available to logged-in customers. A user that is not logged in as a

customer is given a chance to log in.

* Member customers may enter a promotion code.
* Only one promotion code may be used per purchase
* The promotion is a fixed percentage discount that is to be applied to an entire order.
* The discount is specified by the manager at the time of the promotion’s creation or

most recent update/edit.

* Collect a 16-digit credit card number from the customer
* Log/record the transaction

• Allow manager to specify a stop-order for a product

* Each product has its own stop-order status – either on or off. Details of its use are involved

in the following feature.

• Notify manager when products need to be reordered

* When the quantity a product falls below a threshold, the manager is notified that the product needs to be reordered.
* One exception is if the manager has already specified a stop-order for this product.
  + Every product must either have stop-order enabled or disabled

• Allow manager to update stock quantities

* Allow manager to change any product's price
* Allow manager to view transaction logs

• Allow manager to create promotions

* A promotion is a percentage discount that can be applied to an entire order
  + Promotions may only be used by member customers
  + A promotion has an expiration date specified by the manager
* When a promotion is created, it is emailed to all member customers via the email address on

record

1. User Characteristics

The typical ECS user is simply anyone that has access to the network/internet.

1. Constraints

Basic security is required for this system.

* The database must store passwords in one-way encrypted text and there doesn't need to be a password recovery feature nor lockout after numerous invalid login attempts.
* The credit card should be stored using a two-way encryption method.
* A strong password policy should be in place.

1. Assumptions:

* The manager account’s username and password maybe hard coded.
* The manager cannot be a customer.
* Any user can edit their account information.

1. Specific Requirements
2. Restrictions
   1. User Side
      1. Software
         1. Microsoft Edge, Mozilla Firefox or Chrome
      2. Hardware
         1. Any device with any of the above browser
   2. System Side
      1. Software
         1. Web-based application
         2. Database information storage system
3. Data Structure
   1. Category has attributes. E.g. Book has these attributes
      1. Unique ID (auto-increment starting at 1)
      2. Publisher
      3. Author
   2. Products has these attributes by default and the attributes inherited from the category
      1. Unique ID
      2. Name
      3. Description
      4. Price
      5. Reorder Threshold
      6. Stop-order Boolean value
      7. Stock
   3. Customer has these attributes
      1. Unique Username
      2. Password
      3. Name
      4. Email Address
      5. Postal Address
      6. Member/Not Member Boolean value
   4. Manager has these attributes
      1. Username
      2. Password
      3. Email address
   5. Order log entries have these attributes:
      1. Unique ID (auto generated)
      2. Time transaction took place
      3. Date transaction took place
      4. Username of customer
      5. Listing of the contents in customer’s shopping cart
4. System
   1. Browse Inventory
      1. Organization
         1. Items Listed on single page
         2. Items shown in tabular format
         3. Each Item listing contains product properties and the following
            1. Name
            2. Description
            3. Price
         4. Listing sorted by Ascending item Name
         5. No individual Item pages
      2. Interaction
         1. Each Item has checkbox to mark selection
         2. Single button to add all selected items to Shopping Cart
   2. Search Inventory
      1. Search available only by Name or Description of product
      2. Search is exact-match or like
   3. Create, Update and Destroy (CRUD) Functionality
      1. Only managers can modify inventory
      2. Managers have an interface to:
         1. Create a product entry
         2. Update a product entry
         3. Update the stock/quantity of a product
         4. Create a new promotion
         5. Review current inventory
            1. Using the same interface to browse inventory as described in

section 3.1, the manager has an additional “Edit Item” option for each product.

Manager has full CRUD capabilities on each product.

* + 1. Managers may delete items from the inventory
  1. Shopping Cart
     1. Logged In
        1. Can add items to cart
           1. If Item is not in stock, message displayed informing user to try

again later

* + - * 1. Customer can only purchase one of each item (no quantities

associated with orders)

* + - 1. If shopping cart not empty, a user may begin Checkout procedure
    1. Not Logged In
       1. Can add items to cart
       2. User required to login before they may begin Checkout procedure
  1. Checkout procedure
     1. User must successfully use shopping cart before beginning this procedure
     2. Checkout page consists of
        1. A text box for promotion entering
        2. An overview of the purchase
        3. A text box to hold the credit card number
        4. A button to complete the order
     3. Order details sent via email after the checkout has completed
     4. On order completion the inventory is decremented based on items purchased by

user

* 1. Authentication System
     1. User Levels
        1. Manager (single, hardcoded user, no orders)
        2. Customer (unlimited, open creation, unlimited orders)
     2. Account Creation
        1. Everyone can create an account
        2. Required Information
           1. Listed in section 2.2
     3. Account Modification
        1. Users are not able to modify any aspect of their account after creation

(“it would be nice but not needed”)

* + 1. Login and Logout
       1. There is no lost-password recovery
       2. Logging in allows one to logout
       3. Logging in allows checkout
       4. There is a 30-minute session time out after which a logged in user will be

logged out automatically.

* 1. Promotions
     1. Specifications
        1. Applies to entire order
        2. Percentage-off type promotion (x% off entire order)
        3. Expiration occurs at manager specified date
        4. Multiple coupons cannot be applied to same order
        5. Non-member users cannot apply promotions to order
     2. Creation
        1. Promotion created by manager
        2. Each promotion has a unique identifying number (can be auto generated)
        3. Email containing promotion sent to all member users of the ECS

system

* + 1. Deletion
       1. Promotions are auto-deleted when the expiration date has passed
  1. Automated Reorder
     1. Specifications
        1. Manager sets reorder threshold on a per-item basis
        2. If item reaches the reorder threshold, an email is sent informing the

manager of the item’s status and the system automatically reorders the item

* + - * 1. If the item has a stop-order applied to it, it will not automatically

reorder until the manager removes it.

* + - 1. A manager may increase the stock of an item using the manager’s

account

* 1. Order Logging
     1. Specifications
        1. Required Information:
           1. Listed in section 2.4
        2. A manager can view all past transactions from all users

Use Cases



**Use Case: Login**

**Actors:** Manager, Customer

**Type:** Primary and essential

**Description:** Initiated when a user attempts an action that is restricted. The user is then

prompted to enter in their username and password to proceed.

**Includes:** None

**Extends:** None

**Cross Ref:** Required for 2

**Use-Cases:** None

**Use Case: Logout**

**Actors:** Manager, Customer, System

**Type:** Primary and essential

**Description:** The customer or manager will have the option to logout and if that user is

inactive for a given amount of time then that user should be logged out by the system

automatically.

**Includes:** None

**Extends:** None

**Cross Ref:** Required for 3.61

**Use-Cases:** User must have completed the Log In use case.

**Use Case: Browse Inventory**

**Actors:** Manager, Customer

**Type:** Primary and Essential

**Description:** All the products in the inventory are listed on a single page with each product

including its title, name of author, and price. List should be sorted by title.

**Includes:** None

**Extends:** None

**Cross Ref:** Required for 4

**Use-Cases:** None

**Use Case: Add Items to Cart**

**Actors:** Customer

**Type:** Primary and Essential

**Description:** Allows the Customer to place items selected in the Browse Inventory

screen to their shopping cart for later purchase.

**Includes:** None

**Extends:** None

**Cross Ref:** Required for Elicitation Meeting

**Use-Cases:** Customer must have completed the Log In use case.

**Use Case: Add Item**

**Actors:** Manager

**Type:** Primary and Essential

**Description:** Allows the Manager to add an additional product to the inventory that should

include the products price, name, description, number in stock, stop-order, and reordering threshold.

**Includes:** None

**Extends:** None

**Cross Ref:** Required for 1

**Use-Cases:** Manager must have completed the Log In use case

**Use Case: Edit Item**

**Actors:** Manager

**Type:** Primary

**Description:** Lets the Manager edit all the attributes of a particular item in the

inventory.

**Includes:** None

**Extends:** None

**Cross Ref:** Required for 1 and 5

**Use-Cases:** Manager must have completed the Log In use case

**Use Case: Add Promotion**

**Actors:** Manager

**Type:** Primary

**Description:** This allows the manager to add a special promotion such as a certain

percentage off for members. This will email all customers who are members to inform

them of the new promotion.

**Includes:** None

**Extends:** None

**Cross Ref:** Required for 5

**Use-Cases:** Manager must have completed the Log In use case

**Use Case: Checkout**

**Actors:** Customer

**Type:** Primary and Essential

**Description:** This takes the items in the customers shopping cart and processes them for

a purchase.

**Includes:** Use Promotion

**Extends:** None

**Cross Ref:** Required for 3

**Use-Cases:** Customer must have completed the Log In use case

**Use Case: Use Promotion**

**Actors:** Customer

**Type:** Primary

**Description:** If the user is a member they are presented with the option to enter in a

promotion code that will take off a percentage from the total.

**Includes:** None

**Extends:** None

**Cross Ref:** Required for 6

**Use-Cases:** Customer must have completed the Log in and Checkout use cases

**Use Case: Purchase Item**

**Actors:** Customer

**Type:** Secondary

**Description:** Acted on when the user presses the finalize order button in checkout. This

decrements the inventory of all items within the order, email the user, create a log of the

transaction, and check stock to see if a reorder needs to take place.

**Includes:** Send Email, Check Stock

**Extends:** None

**Cross Ref:** Required for 3 and 7

**Use-Cases:** Customer must have completed the Log In and Checkout use cases

**Use Case: Check Stock**

**Actors:** System

**Type:** Secondary

**Description:** Checks to see if stop-order is on for a item and if it is checks to

see if the amount in stock is below the reorder amount. If it is then it will reorder.

**Includes:** Send Email, Reorder

**Extends:** None

**Cross Ref:** Required for 5

**Use-Cases:** None

**Use Case: Reorder**

**Actors:** System

**Type:** Secondary

**Description:** Reorders a item and emails the manager.

**Includes:** None

**Extends:** None

**Cross Ref:** Required for 5

**Use-Cases:** None

**Use Case: Send Email**

**Actors:** System

**Type:** Secondary

**Description:** This is called by a variety of other use cases whenever an email need to

be sent.

**Includes:** None

**Extends:** Add Promotion

**Cross Ref:** Required for 5, 6, and Elicitation Meeting

**Use-Cases:** None

Non-FunctionalRequirements

* The web pages must be responsive up to 5-inch screen mobile devices
* Unit test cases must be written for all services and front-end
* Continuous integration must be in place
* Deploy the application in a docker container
* Availability and scalability are not a concern
* Standard web page optimization techniques (static resource caching, minification, combining, image sprite etc) must be applied

Proposed logical architecture

Delivery Plan

The application development must follow agile methodology. The features are to be delivered in two releases.

1. Release 1

* Login & Log out
* Browse Inventory
* Add Items to Cart
* Add Item/Product
* Edit Item/Product
* Check out
* Purchase Item

1. Release 2

* Add Promotion
* Use Promotion
* Reorder
* Send Email

The training team may limit the application feature set to that of RELEASE 1 based on the allotted time for the case study (those interested shall complete both the releases). Otherwise both the releases must be done.